SOME FEVERS met with in SOUTH AFRICA.

Their Treatment and Diagnosis from Clinical Observation during the Boer War 1899 - 1902.

THESIS for DEGREE of M. D.

H. Richardson,

(late) Lieut. R.A.M.C.

M.B., C.M. Edin. 1895

The large numbers of troops engaged during the War have naturally afforded a very considerable amount of material for study for medical men.

Apart from gunshot wounds, the most frequent cause of disability of the soldier has been fever of some kind. The fact of the great importance of the diagnosis and treatment of these febrile conditions, both to the army surgeon, the general in command, and the patient himself, is my reason for writing on the subject.

The army surgeon has a duty to perform towards the army as well as towards his patient. He has to do his part in keeping the army up to its highest fighting strength by preventing disease, but also this fighting strength depends to a large extent on his accurate diagnosis and treatment of disease when it does arise and by his prognosis thereof. The success of an army in the field depends on the medical officer to a much larger extent than is often supposed; for example, we may note the importance of diagnosing between a case of Enteric Fever and a case of so-called Simple Continued Fever occurring in a soldier at the front. Let us suppose the case is diagnosed as Enteric /

Enteric Fever and the patient is sent to the base, very probably it has to be diagnosed within a day or two after being seen for the first time in order to take advantage of transport; now perhaps the case turns out to be one of Simple Continued Fever lasting possibly only a week or two and having no intestinal lesions, and the man fit for duty three or four days later. By a wrongful diagnosis of Enteric Fever in this case, the services of an able man at the front would have been lost for probably a very considerable period.

The following is an example where the prognosis may be seriously affected by an early wrong diagnosis. The medical officer is in charge of a small field hospital at an advanced post some thirty miles from a General hospital, transport is irregular and precarious, and he has only a few bell tents for the accommodation of his patients. His object is, when transport is available, to transfer as many patients as are fit for the journey in order to keep up his power of accommodation. A case having had fever a few days is proposed for transfer, if it is really Enteric Fever it is at any rate in an early stage and stands the thirty miles in an ambulance probably quite satisfactorily. /

satisfactorily. On the other hand the medical officer may think it is a case of Simple Continued Fever and keeps him in the expectation that he will be fit for duty in a few days, but it turns out to be Enteric later on. In these circumstances the prognosis is most unfavorably affected, the patient may have to be transferred at a later stage when not in such a good state to stand the journey and much more liable to perforation or haemorrhage; or, on the other hand he may be kept at the Field hospital where the conditions for his treatment would not be nearly so good as they would have been at the General hospital to which he might have been transferred early if the correct diagnosis of Enteric Fever had been made at once.

In the first of these examples the medical officer would have failed through faulty diagnosis in his duty towards the army; in the second, in his duty towards his patient. I have mentioned these examples to show the importance of the early diagnosis of fevers on active service.

The fevers which caused the greatest perplexity to army surgeons were Enteric Fever, and the fever which /

which in the army returns we called Simple Continued Fever. It is with a wish to aid in clearing up the subject of this latter fever that I have chosen this subject to write on. Other fevers which must be considered in connection with these two are Malarial Fever, Sun Fevers, Fever of dysentery, and the pyrexias of Influenza and Pneumonia.

Typho-Malaria should also be named independently the definition of which is "Typhoid in a person who has been exposed to Malarial infection." Manson.

SIMPLE CONTINUED FEVER.

There has been much diversity of opinion concerning this Fever. Is it malarial? Is it modified Enteric Fever, or is it due to some other alteration in the condition of the alimentary tract?

The name of Simple Continued Fever is very much used in the army, but Crombie's description in the Transactions of First Indian Medical Congress differs considerably from that commonly given by army surgeons. What he calls "Low Fever" is more like the Simple Continued Fever of the army, but he states that quinine in "Low Fever" causes great discomfort and no /

no good effect, whereas in Simple Continued it generally is distinctly beneficial; and he also states that Low Fever is commoner among natives.

Manson confesses that there is little doubt that there are a number of fevers specifically different from Malaria and Typhoid. Simple Continued Fever is one of this class, and it seems to me it may be profitable to state what one has observed about it with a view to aid in the elucidation of these fevers. It may perhaps it due to a specific organism found in certain latitudes, as Mediterranean Fever is proved to be caused by the Micrococcus Melitensis.

At present the diagnosis of Simple Continued Fever is entirely based on clinical observations. It prevails during the same seasons of the year in which Enteric Fever is found. In my South African experience it is more common amongst troops in garrison than amongst those actually in the field.

The temperature charts show a resemblance to Malaria, but there are no marked rigors or sweats. It is accompanied by gastro-duodenal catarrh and congestion of the liver, and is often succeeded by jaundice which is epidemic during the season in which Simple Continued /

Continued Fever is common. The prominent symptoms are a feeling of malaise and loss of appetite. There is a good deal of initial headache, but it is not severe, and is relieved by mild diaphoretic treatment and rest in bed. Occasionally patients suffer from fever of this kind and feel well all the time as long as they do not have to undergo any exertions.

It is not a fatal disease in itself, but is apt to recur, and is occasionally very hard to get rid of, necessitating complete change of climate. It appears to me that there is quite a marked relationship between derangement of the digestive system, gastro-duodenal catarrh usually and jaundice, and the presence of the fever, this is shown in many of the cases who only got fever while engaged on some duty entailing a rather sedentary life. The men were not nearly so prone to get this fever while actually in the field leading a more active life. The residents of certain districts in the Transvaal suppose that a sedentary life is conducive to this kind of fever, and a favorite cure of theirs is to place the sufferer in a "Cape cart" and send him for a drive across the veldt, this course of treatment entailing a very considerable amount of exercise /

exercise owing to the jolting of the cart, and thereby acting as a stimulant to a sluggish liver, and an aid to digestion.

The following cases are quoted to illustrate this "Simple Continued Fever". In the first case the diagnosis was very difficult. I do not believe the patient suffered from Enteric Fever, but the symptoms were due to the presence and action of some other organism.

C.R. Aged 28. Civil Surgeon.

He had been about one year in the country. He was stationed at a small village on the railway line, and probably led a fairly easy life with plenty of food. He drank a good deal of whisky, and did not take much exercise. He was in the habit of wearing a field service cap on one side of his head, the other side, the left, being quite exposed to the sun. He had had an attack of fever lasting a fortnight four months previously.

Admitted to hospital December 6th 1902.

Complaint - Severe headache confined to left side of head, and a general feeling of malaise.

State /

~~7a~~

Simple Continued Fever.

Records of Temperature, Pulse, Respiration, Stools and Urine, from 6th Day of December 1901

In the case of C. R. Dec. Aged 28 Occupation Civil Surgeon. Jan. 1902

Day of Month.	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5
Day of Disease	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34

CENT. FAH.

41° 106°
105°
40° 104°
103°
39° 102°
101°
38° 100°
99°
37° 98°
97°
36° 96°

On admission Temperature 103 1/2 Pulse 65 Respiration 24 Urine Sulph. 6 grs. 10 a.m. + 2 p.m. Sulphonal 6 xx Urine Sulph. 6 grs. 10 a.m. + 2 p.m. No headache. Feeling well. Sulphonal 6 xx Spinal 6 xx Mist. Chloral + Bromide Sleeps badly Sticking throughout Sulphonal 6 xx Feeling well Sleeps badly

Pulse.	Milk Diet.																														
Resp.																															
Stools.		0	3	0	1	1	1	1	0	1	2	2	1	1	0	0	1	2	1	1	1	1	1	0	1	1	1	1	1	1	1
Urine.																															

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State on admission after a journey of five hours. Temperature 99° F. Tongue slightly furred at the back. Liver enlarged. Spleen normal. He was given calomel and was confined to bed, and an ice bag applied to his head. He had been ill three days before admission. The headache left him in three days, the tongue was quite clean, and he expressed himself as feeling very well, but the temperature was still about 102° F. He then got 10 grains of quinine sulphate twice a day at 10 a.m. and 2 p.m.

After the fifth day he never had any discomfort nor bad symptoms, and slept and took his nourishment well. There was no rash.

At the end of the fourth week his temperature became normal night and morning, and he had an uninterrupted convalescence. His blood was examined both in the morning and afternoon, stained and unstained, but the malarial plasmodium was not found. He had four weeks fever, but during that time there were none of the usual symptoms of Enteric Fever, his tongue was clean and the bowels acted naturally. His chart is appended.

Capt. A. Aged 27.

He had been ten months in South Africa and had /

Simple Continued Fever.

Records of Temperature, Pulse, Respiration, Stools and Urine, from 10th Day of December 1901

In the case of Capt A. Dec Aged 27 Occupation

Day of Month.	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Day of Disease	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

CENT. FAH.

41° 106° 40° 105° 104° 39° 103° 102° 38° 101° 100° 37° 99° 98° 36° 97° 96°

admitted. headache. in evening Sat

Quite hay fever Quite Well

Better Sulphonal 6 xx

Slight headache Temp. turned

No Sleep Sulphonal 6 xx

Feeling quite well

Sulphonal 6 xx

Getting up

Pulse.										Milk Diet.											
Resp.																					
Stools.	2	0	1	2	2	1	0	0	1	1	1	1	1	1	2	0	2	1	1	1	1	2
Urine.																					

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had no illness till he went into garrison near Klerksdorp.

Admitted to hospital December 10th 1902.

Complaint.- Headache and malaise of four days duration.

State on admission.-

Temperature 101° F. Tongue furred. Liver and spleen normal. He was given Calomel and confined to bed on milk diet. On second day he was given a mixture quinine sulphate and magnesium sulphate. After the first day he had no more discomfort, and no bad symptoms except slight tenderness in abdomen. Examination of his blood was negative. His convalescence was uninterrupted. He had been quite well while serving with a mobile column. When he took up a sedentary life I think he probably got some gastro-duodenal catarrh and liver congestion with faulty elimination of waste products and fever in consequence. He had no usual signs of Enteric Fever, but his temperature looked malarial.

Lieutenant C.W. Aged 32.

He had been nine months in the country and had no previous illness at the time of this attack. He /

Simple Continued Fever.

Records of Temperature, Pulse, Respiration, Stools and Urine, from 30 Day of December 1902.

In the case of Lieut C. W. Jan 1903 Aged 32 Occupation

Day of Month.	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Day of Disease	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

CENT. FAH.

41° 106°
105°
40° 104°
103°
39° 102°
101°
38° 100°
99°
37° 98°
97°
36° 96°

Headache Calomel Gr ½
Nose bleed Sick & faint Sick
No sleep Sulphonal
Sulphonal
Sulphonal
Sulphonal
Feeling well
Getting up.

Milk Diet.

Pulse.																
Resp.																
Stools.		1	3	1	1	0	0	1	1	2	1	1	1	1	1	1
Urine.																

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He was doing garrison duty at a post on the Vaal River.

Admitted December 30th 1902.

Complaint.- Headache rather severe, and a feeling of malaise for three days before admission.

State on admission.- Tongue furred. Liver and spleen normal. He had had some diarrhoea. The case looked like one of Enteric Fever, but after the second day all bad symptoms disappeared, and he stated that he felt quite well, though he slept badly. His blood was examined with negative results. Treatment was the same as in the above cases. This patient belonged to a cyclist corps and before going into garrison on the Vaal he had had a very active life, and while moving about he remained quite well.

This case looks somewhat like Influenza also, but there were none of the usual catarrhal symptoms.

Lieutenant C. Aged 25.

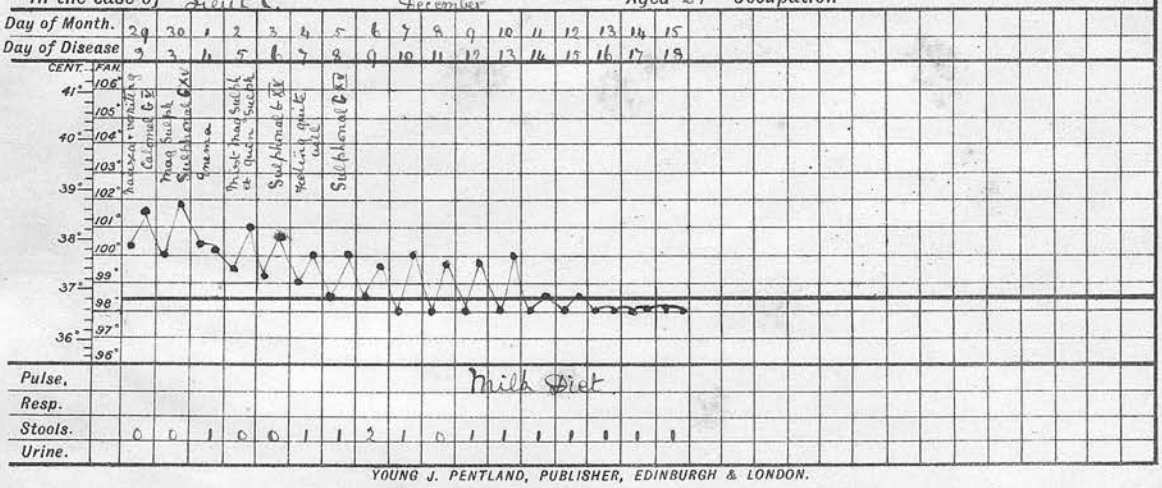
He had been a little over a year in South Africa, and had had no fever previous to the present attack.

Admitted to hospital November 29th, having been ill three days. He had quite recently had an attack of /

Simple Continued Fever.

Records of Temperature, Pulse, Respiration, Stools and Urine, from 29 *Day of* November 1901

In the case of Lieut C. December *Aged* 21 *Occupation*



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of jaundice.

State on admission.- Tongue was very furred, and he suffered considerably from nausea with some headache. His conjunctivae were yellowish, and he was generally of an icteric tinge. There was some tenderness in abdomen, liver and spleen normal.

There were no symptoms of Enteric, and he felt fairly well in two days, though the temperature remained raised at nights.

This patient also was on garrison duty at the time. He was treated in same way as the others, and recovered quite satisfactorily.

No plasmodia were discovered in his blood, and he had never been in a malarial district.

The above four cases are examples of what we have been accustomed to call in the army Simple Continued Fever. Its name, indeed, affords great opportunity for laxity in diagnosis. I have noticed in an account of the work in the Yeomanry hospital mention was made of "Cases of indefinite pyrexia which go under the much-abused name of Simple Continued Fever". Some, the writer went on to say, were Influenza, while others appear to belong to some still undetermined Fever /

Fever. The above cases were examples of these, and I saw many more of precisely similar character, so that until their nature is more thoroughly cleared up, we can give them no more definite name. Compulsory notification has been introduced by the M.O.H. of the Transvaal, and this may help to trace them to their source.

All my cases occurred during the same time of year, and almost all the patients were doing garrison duty. They all lost the bad symptoms after a day or two, though the fever persisted for varying periods. There was a tendency to constipation, and they were therefore given a mixture containing sulphate of magnesium. They were given jelly and custard when the tongue cleaned, and were put on chicken, and allowed up two or three days after the temperature had been normal night and morning. Insomnia is a very frequent feature. The examination of the blood gave a great deal of difficulty. The films dry up very quickly, and cause cremation and distortion of the corpuscles. In true malaria where the plasmodia have been observed, it is much less common to find the flagellated bodies in patients in Africa than in England /

England. This would seem to be due in some way to the climate also affecting the films.

MALARIAL FEVERS.

In certain districts of South Africa, Malaria is common. I was not in those districts and do not propose to enter into the fever found there. I saw cases of malaria in troops who had been stationed in the Komati Valley, they were not as a rule severe. There was also a good deal of it amongst troops coming from India.

A form of malarial fever, commonly called Beira Fever, was very common amongst the troops forming the Rhodesian Field Force. They landed at Beira and were camped for about three weeks on low land near the coast, which at certain seasons of the year was under water. These troops were composed of Australians and New Zealanders, about 80% of them suffered from fever while at Beira.

A large proportion of these men passed through my hands during the ten months after they left Beira. They were suffering from symptoms very like those of Simple Continued Fever, but were more definitely malarial /

malarial in character.

It was not possible to examine the blood in these cases, as we were at the time part of the mobile columns.

The cases were mild and of short duration. The patient came into hospital complaining of headache and pain in the back, he had been feeling done up for two or three days, and had been unable to take food. Suddenly acute pains in the back had come on accompanied by vomiting, and he was obliged to come into hospital. This attack was usually ushered in by a kind of rigor, and thereafter the temperature kept at nights up to 100° F. or 101° F., for three or four days being normal in the mornings. Quinine in 10 grain doses usually relieved the symptoms, and the patient was well in a week and fit for duty.

All the men who had these attacks had previously had fever at Beira, and in many cases the spleen was enlarged.

These cases were seen while on the "High Veldt" in a district apparently free from malaria. The predisposing cause was a chill or over-fatigue. The other troops in the column did not suffer in the same way /

~~was~~ in the least.

These cases seem to me to have been due to some specific organism which had invaded the troops while camped at Beira. The attacks were quite distinct from Simple Continued Fever, they were more definitely malarial and more quickly influenced by the administration of quinine. They were also easily diagnosed from Enteric Fever. There were no bowel symptoms, and they always occurred in troops who had been at Beira.

ENTERIC FEVER.

It is of interest to compare some points of this fever as met with in South Africa with those one usually finds associated with it in England. The following statements are based on observations of cases under my care and on statistics collected in a General Hospital.

The disease is commonest in mid-summer. The conditions under which it was observed were often very unfavourable to thepatient, and the death-rate, therefore should not be compared with that at home.

Initial headache and backache are well-marked. There /

There is generally a great deal of constipation in the early stages of the disease with meteorism and distension of the abdomen. Bronchial catarrh is usually present. Temperature occasionally takes a course as at home, but often shows a marked tendency to drop in the mornings. During convalescence, very frequently after the temperature has been ten days or more normal, there is a sudden rise at night and possibly for two or three succeeding nights, this rise being unaccompanied by any bad symptoms, the tongue remaining quite clean, and the patient feeling quite well. I have noticed this occurrence in several cases, and learnt that it need not be viewed with alarm, though at first it tends to make one fear a relapse.

The pulse is usually fast and varies with the rises in temperature. The heart's action appears to become weaker rather soon in the disease, and calls for alcohol to be given in some form. Very little help can be got in diagnosis from the appearance of rash. Rashes due to heat, sweat, or vermin are so common, that the rose spots even if they were present, were obscured and confused by them.

In a few cases, and those the most severe I have seen, /

seen, and which as a rule ended fatally, there was present, commencing in the end of the third week, a punctiform rash of haemorrhagic character. It was most marked in the forehead, but was also present on the thighs and abdomen. From notes of cases of other medical officers in charge of Enteric wards, I find that this rash was present in a very small proportion of cases, and was considered a very bad sign. This haemorrhagic rash was usually accompanied by quite a marked increase of nerve weakness and low delirium.

In the early part of the "Enteric season" nervous symptoms are more common than in cases occurring later on, possibly because the disease is not recognised so readily at the commencement of the season, and treatment is not begun so soon.

Haemorrhage has not been so fatal as in my experience at home. Slight haemorrhage seemed to have a beneficial effect on the course of the disease, and I also saw patients recover from very severe haemorrhages.

Before the patients arrived in hospital they had often to be subjected to great discomfort and fatigue, and this I think tended to increase the frequency /

frequency of haemorrhage and perforation.

Perforation occurred more commonly as stated above. In one of my cases it was announced by sudden acute pain with a marked drop in the temperature, and increase in the pulse rate. This case ended fatally in about 12 hours. In two other cases it was very difficult to definitely diagnose perforation; the pain in the abdomen did not begin so suddenly but came on in fits and starts, the pulse was quickened but the temperature did not drop markedly, and the abdomen was very little distended. Both these cases gradually sank and died in two or three days. The perforations were discovered post-mortem, and till then the diagnosis was not absolutely certain.

As to treatment, the chief point to be noted is the greater need for stimulants, at any rate in most districts in the Transvaal. Heart failure is common, and alcohol is usually indicated early in the disease, and that although the patients observed were as a rule young and healthy men the class of patient who would pass through an ordinary attack of Enteric Fever at home without stimulant of any kind. Strychnine and Digitalis are often necessary also. This tendency /

tendency to heart failure was partly due to the high altitude of the "High Veldt" and most part of the Transvaal, and partly due to the hardships the patients often had to undergo in the early stages of the attack quite unavoidably. Quinine is indicated in those cases showing tendency to intermittency due to previous malarial infection, and in one such case Quinine Hydrobromate was used hypodermically with apparently good effect.

The commonest sequela to be seen was "Swelled leg" due to phlebitis. The character of the phlebitis was, as a rule, mild, and the oedema passed off rapidly. There was a slight rise of temperature at first with a good deal of pain in the limb, which passed off in a day or two as a rule. The left leg was most commonly affected, the right less frequently and rarely both legs. I have seen one case of periostitis of a rib followed by an abscess. Periostitis of the tibia was fairly common. I had one case of neuritis causing dropped ankle.

TYPHO-MALARIA is described as Typhoid in a person who has been exposed to malarial infection. The course of the Typhoid Fever is influenced by the intermittency /

intermittency which is seen in any disease in a patient who has had malarial fever at any time. In two severe cases which were under my care, the typhoid symptoms were first noticeable and the malarial character was taken on later, but occasionally the typhoid symptoms supervene in a case which was originally malarial.

The following case with a copy of the temperature chart will illustrate the above.

Capt. B.

Admitted 12th February 1902.

He was complaining of headache and pain in back. His tongue was heavily furred, he had been ill one week. His liver and spleen were both enlarged.

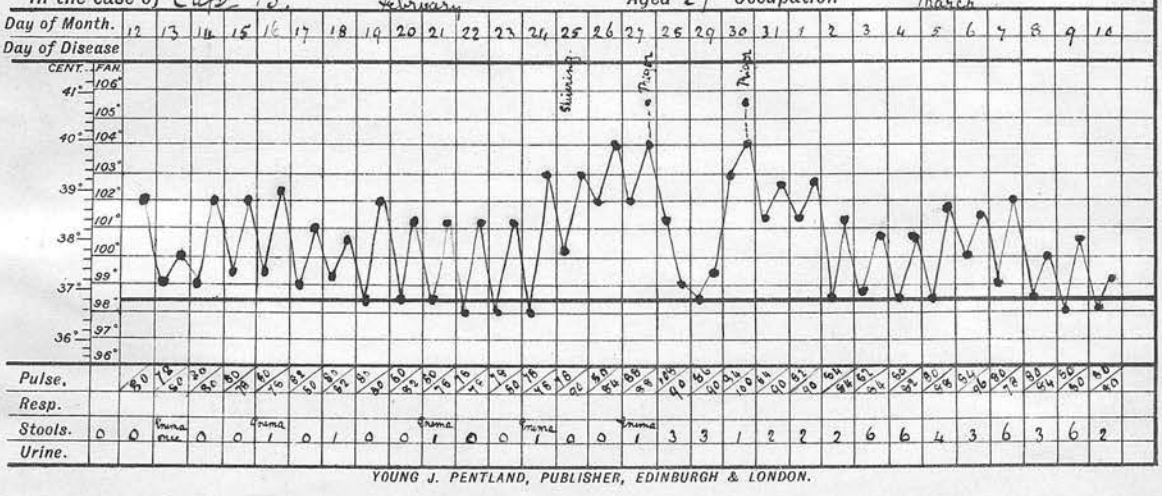
He had had malarial Fever in Nigeria and one attack in South Africa where he had been serving for two years.

For the first two weeks of his illness, his whole appearance was typhoid, and there were no particular points to note. He had some headache, and was extremely irritable. During the third week he became delirious and had distinct rigors, the malarial plasmodia were present in his blood. During the /

Typho Malaria.

Records of Temperature, Pulse, Respiration, Stools and Urine, from 12 Day of Feb. 1902

In the case of Capt B. February Aged 27 Occupation March



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the fourth and fifth weeks, his temperature became gradually lower, still with a tendency to malarial rigors. There was a rash on the abdomen which appeared to be a typical Enteric one. He suffered from constipation in the early stages, which later on gave place to diarrhoea with stools typically Enteric in character.

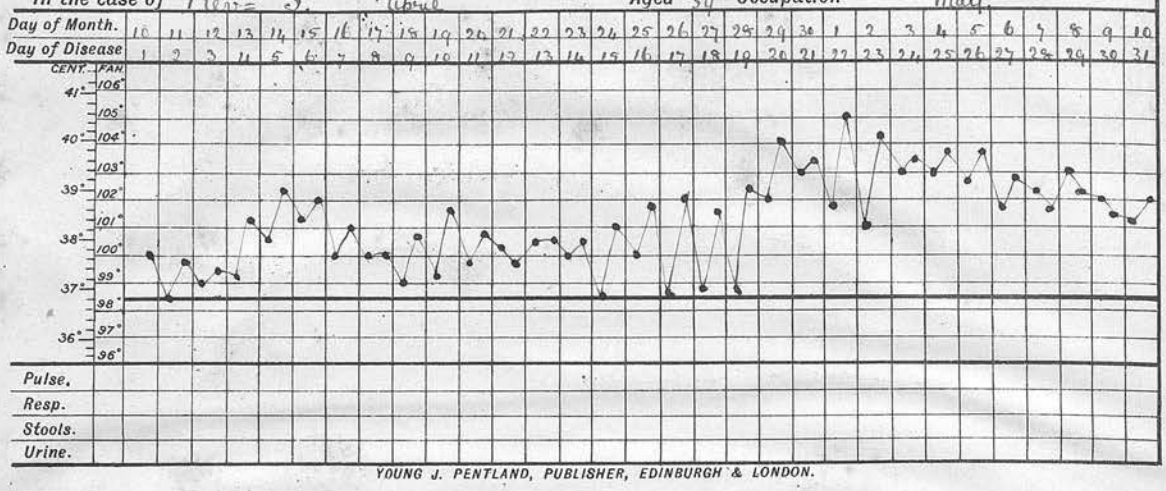
His pulse was rather slow at first, but became considerably accelerated during the third week, and at this time his condition became very alarming owing to failure of the heart, although he was not the least anxious about himself, and said he felt quite well. During his convalescence he suffered from neuritis of the left thigh and leg.

The second case of typho-malaria occurred in an officer who had served in West Africa. His spleen was very much enlarged, and he stated that he suffered repeatedly from malarial attacks. He passed through a severe attack of Enteric Fever, his temperature showing the same tendency to drop in the morning as in the chart of Capt. B's case. This patient was given hydrobromate of quinine daily in the morning. He was extremely delirious at nights and lay during the /

Enteric Fever.

Records of Temperature, Pulse, Respiration, Stools and Urine, from 10th Day of April 1902

In the case of Revd S. April May Aged 39 Occupation



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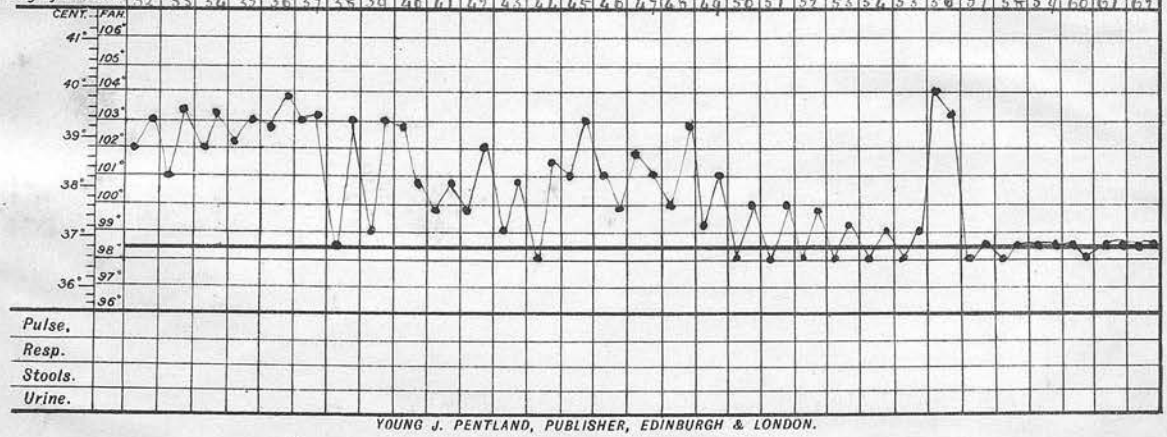
Enteric Fever.

Records of Temperature, Pulse, Respiration, Stools and Urine, from 10th Day of April 1902

In the case of Revd S. May June Aged 39 Occupation



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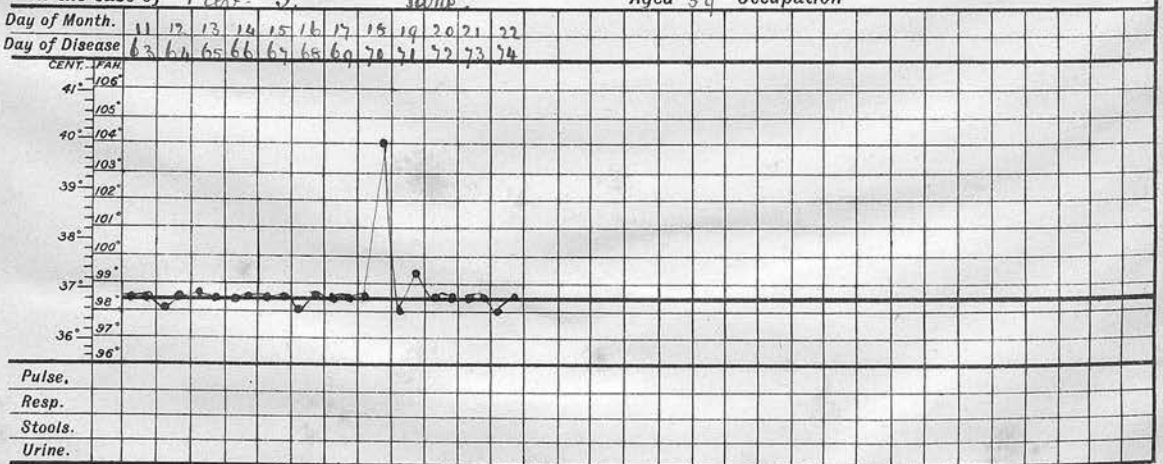
Enteric Fever.

Records of Temperature, Pulse, Respiration, Stools and Urine, from 10th Day of April 18

In the case of Revd S. June. Aged 39 Occupation



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the day in a semi-comatose condition for four days, during which time it was extremely difficult to feed him, and he was fed to a large extent per rectum. He eventually made a satisfactory recovery.

The following case illustrates the class of cases mentioned above, in which the haemorrhagic rash was present.

Rev.d S.

Admitted April 10th 1902.

He was complaining of headache and pains in the back, and the case progressed as an ordinary case of Enteric Fever till the third week, when the patient became very delirious, his temperature rising to 105°. He remained in a state of delirium for a fortnight. The rash appeared in the fourth week, beginning on his forehead and spread to his arms, legs, and then to the trunk, it was haemorrhagic and punctiform; the ordinary rose rash had not been previously seen on the abdomen. The case was very protracted, and convalescence was interrupted by rises of temperature accompanied by no serious symptoms. He had no diarrhoea, and there was no enlargement of liver or spleen. His chart is appended to be compared with that of Capt. B. /

B. in which the malarial complication is shown by the tendency of the temperature to drop in the mornings.

The diagnosis between Simple Continued Fever and Enteric Fever was very often most difficult; many medical men considered Simple Continued to be a modified form of Enteric Fever. I believe the two fevers are distinct, and that it is important to be able to lay down definite points of diagnosis between them. There are many points in common, but some points can be found to enable a diagnosis to be made.

Both fevers are commonest about the same time of life, they prevail during the same months of the year, and generally under very similar conditions, as the following statistics from a General Hospital in the Transvaal show.

The prevalence of each at different times of the year is shown in this table of admissions for the various months.

	Enteric Fever.	Simple Continued Fever.
January	65	51
February	46	27
March	26	17
April	27	19
May	36	3
June	0	1
July	6	4
August	5	1
September	1	3
October	20	16
November	43	27
December	46	34

The Enteric Fever cases are the more numerous. Simple Continued Fever was often treated in the field hospitals, whereas every case of Enteric Fever was sent to a General Hospital sooner or later.

In the middle of Summer both diseases were at their height, and the number of cases of each gradually sank till in the middle of the Winter season there were only occasional cases.

The age of the patient is very much the same in both diseases. In 60 cases of each admitted during 1901, the average age in Enteric Fever was 25 years and one month, and in Simple Continued Fever it was 24 years and 6 months.

In the diagnosis we have to trust, therefore, chiefly to the history of onset and symptoms, and to a large extent to the course that the fever runs.

The appearance in Enteric Fever is more anxious, the face is often flushed, while in Simple Continued Fever there is a sallow or yellowish tinge in the skin. Occasionally a typical rose rash was present, and was of assistance in diagnosing Enteric Fever, but in many cases it was obscured by the presence of sudamin~~eis~~al rashes which were also present in cases of /

of Simple Continued Fever.

The tongue was furred in both fevers; in Enteric the tip was usually reddish and also the edges, while in Simple Continued the fur was heaviest at the back of the tongue, and the breath was very offensive. Vomiting was a common occurrence in Simple Continued Fever. In both there was usually constipation; the abdomen was more distended in Enteric and abdominal discomfort was more marked.

The pains complained of in Simple Continued Fever were chiefly muscular accompanied by headache of neuralgic character, while sleeplessness was a marked feature, the headache in Enteric being chiefly at the back and top of the head, and the patients were often in a peculiarly drowsy state.

The pulse rate was slower as a rule in Enteric Fever.

The aid to be got from the temperature is shown in the accompanying charts.

After all, however, diagnosis must often be deferred for some days to watch the course of the illness, and even after three weeks fever at times it is hard to say whether the disease has been Enteric Fever or /

or not for certain, and in such cases it is necessary to treat the convalescence as one of Enteric Fever.

Innoculation of antityphoid serum for the prevention of Enteric Fever increased to some extent the difficulties of diagnosis, as many men were innoculated and subsequently contracted Enteric Fever and passed through a modified attack very much resembling Simple Continued Fever.

The question of benefit by innoculation of antityphoid serum is not yet fully settled, but it appears probable that at a certain age a person is more liable to get Enteric Fever within a few months after innoculation if exposed to infection. This period of increased susceptibility after innoculation is not yet fixed, but statistics do point to the probability that, if this period of increased susceptibility is safely passed, a person is rendered to some extent immune from Enteric Fever thereafter. For how long this immunity may be expected to last has not yet been determined.

It is interesting to note that Enteric Fever occurred amongst troops occupying districts of apparently virgin soil. In these cases the recently conducted experiments of some R.A.M.C. officers are of value. /

value. In these experiments it was shown that the vitality of the bacillus was marked, even after prolonged periods, when the bacillus was kept on various articles, for example, the serge used in the ordinary soldier's clothing.

Also Surgeon Captain Firth was able to determine the presence and vitality of the bacillus in soil, six months after he had artificially infected it with typhoid dejecta, and there are examples of its having retained its vitality for much longer periods. It is therefore quite evident that bacilli can live in various situations, from the season when Enteric Fever is mostly prevalent in one year, until the same season in the next.

It seems, therefore, that it might be of great practical utility in lessening the prevalence of Enteric Fever among our troops if there could be instituted at certain seasons of the year systematic sterilization of the kit of the soldier. This would do away with the possibility of his carrying in his clothing any bacilli in a dormant condition from one season of activity to the next, thus obviating what appears to be one at any rate possible mode of infection.

These /

These systematic sterilizations might take place in South Africa in the end of May and the beginning of November. Again on troops leaving a district where Enteric Fever has been prevalent and proceeding to a district of "Virgin Soil" another sterilization might profitably be carried out.

As to why there is a period of the year when the bacillus of Eberth is more active than at others, there is no conclusive argument, presumably the greater warmth and increased moisture are more congenial to it. The wet season also, by washing it from its hiding-places in the soil, may increase its powers of infection by spreading it broadcast over the surface of the soil. When the soil again dried and the winds began to blow another of its "Modes of Infection" would be advanced, namely, its conveyance in dust into the human organism. We must not forget that, apart from the increased activity of the bacillus and its increased facilities for transmission in the "Enteric Season" at the same time the human subject is more disposed to fall a victim to its attacks. At this season catarrh of the stomach and bowels is prevalent with its accompanying diarrhoea, and on account of this and other /

other indispositions there is a lowering of the vitality of the human frame.

As to the commonest "Mode of Infection" of the soldier during the South African Campaign, I consider dust to have held the first place. In large standing camps with numerous open latrines it was a common sight to see flying about bits of paper from the latrines that had been used after defaecation and possibly by a convalescent enteric patient, and the dust which blew about in clouds may quite well have carried the bacilli deposited in the latrines in the dejecta or passed in the urine, for we know that the bacilli may be present for some time after convalescence. This dust found its way into the nostrils and mouth, and was of necessity often swallowed.

Water and milk both received their share of blame, but they were chiefly harmful in direct proportion to the amount of dust with which they were contaminated.

Direct infection undoubtedly occurred in many cases among the nursing sisters and orderlies of the R.A.M.C., the latter being a class into whom in many cases it is difficult to instil caution and proper cleanliness. The men when on trek were in the habit of /

of drinking water from any stagnant pool they passed, but this water though it certainly caused diarrhoea and other digestive disturbances was probably rarely if ever the vehicle that conveyed the infection of Enteric Fever.

INSOLATION or THERMIC FEVER.

The cases of this class of fever were of the milder variety; we did not get the cases with sudden unconsciousness or with very high body temperature. The cases met with occurred among men exhausted from fatigue caused by prolonged exertion in the heat of the sun. The heat of the sun alone was not apparently sufficient to cause "Heat Stroke", for in standing camp while the men were not undergoing much fatigue, they would be about in the sun all through the hottest part of the day but suffer no deleterious effects. In the case of a man, however, whose vital powers had been somewhat exhausted by prolonged exertions, the heat of the sun appeared to cause a kind of thermic fever with symptoms of a milder form than those described by Manson as being caused by the heat of the sun in India and elsewhere.

The most noticeable symptoms were pain in the back /

back and neck usually accompanied by vomiting. The face was flushed with injected conjunctivae, the pulse quickened and irregular, and the temperature between 100° F. and 102° F.

The attack was not of long duration, the fever lasting a day or two, and the diagnosis was generally easy from the history of the attack and the symptoms described.

The following is a typical case of this kind of fever.

Pte. A.S. Age 23.

Admitted to Field Hospital on December 14th.

Patient was with a mobile column trekking in the "Bush Veldt", and the day had been very hot. He had been up two hours before sunrise, and had had a long ride getting into camp about 1 p.m. He then went out on outpost duty being exposed to the heat of the sun during the whole time. He suddenly "felt queer" apparently getting giddy and faint, and had to be sent into hospital in an ambulance.

On admission he complained of severe headache; he had been vomiting. His temperature was 102° F.

He was given calomel, and a blister was applied to /

to the back of the neck. The next day his temperature was 100°F. in the evening, and he felt better. He was given a mild diaphoretic mixture, and was quite well in three days.

Cases of such a kind were fairly common in the hot months, chiefly occurring among troops who had been only a short time in the country.

As regards other conditi ons in which fever was met with during the South African Campaign, there was a form of catarrhal Influenza like an ordinary feverish cold, which occurred occasionally in epidemic form. Such a condition was present to a considerable extent among the troops forming Lord Roberts' army during his advance to Pretoria. It was not of serious importance, but it is of interest to note that it occurred among men living an open-air life. As a matter of fact the men lose the advantages of open air to a great extent by their habit of lying together in bunches at night, and often under the same blanket, thus breathing previously respired air to just as great an extent as if living in a room. This habit probably accounted to a large extent for the spread of this infection.

A few cases of Pneumonia were met with amongst the /

the troops actually on trek, but it was rare probably on account of the open-air life the troops were leading, although frequently exposed to cold and wet, often indeed, in the rainy season sleeping night after night in soaking wet clothes and blankets. When pneumonia did occur the prognosis was grave, chiefly from the fact that it was impossible to give them rest, and heart failure was common.

During the latter part of the Enteric Season when the weather became very cold at nights, pneumonia became a rather frequent complication of the cases of Enteric Fever. It was ascribed in some cases to the habit of sponging patients with high temperatures, and undoubtedly tepid sponging ought to be performed with the greatest care and least possible exposure in cases treated as these were under canvas, as it is extremely difficult to prevent a tent being draughty.

As to the fever which was one of the symptoms of dysentery, there is not very much to note. The diagnosis was made from the presence of the usual signs and symptoms of dysentery, and the fever as a rule was not high, although the dysenteric symptoms were severe. The height of the temperature was no indication of /

of the severity of the disease. In mild cases the temperature often remained normal all through the course and in most severe cases I have seen it rising to 100° F. at night, and being markedly subnormal in the mornings. On account of the usual symptoms of dysentery, the febrile condition was easy to diagnose from Simple Continued Fever or Enteric Fever.

As I have endeavoured to show, the chief difficulties of the army surgeon in regard to fevers, lay in the diagnosis between Simple Continued Fever and Enteric Fever or rather mild cases of Enteric Fever. In severe cases of the latter there could be no doubt. There is, I believe, a great deal more to be learned about Simple Continued Fever, and I have endeavoured to bring forward the important aspects of the condition by means of my own observations of it, and by the help of notes of other medical officers who had been engaged in treating it. Since coming to England I find there is very little literature on the subject and very little help to be got from it. It may therefore be useful to record its clinical aspects and the points of resemblance and distinction between it and Enteric Fever, and for that purpose this thesis has been written.